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November 3, 1998

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Confirmation by Courier

International Preliminary Examining Authority
European Patent Office
D-80298 Munich

Dear Sirs:

Re: Cargill Incorporated et al
PCT/US97/15844
International Filing Date: October 2, 1997
Case 119,387

RESPONSE UNDER RULE 66.3 TO WRITTEN OPINION

In response to the Written Opinion issued by the International Preliminary Examining Authority (EPO) on July 7, 1998, applicants present an amended set of claims which distinguish the present invention from the disclosure in U.S. Patent 5,132,456.

To this end, all twenty-three (23) claims of the published PCT specification are canceled and replaced by eighteen (18) new claims. Copies of those eighteen new claims accompany this response.

Additionally, page 2 of the specification is replaced by new page 2 which correctly identifies the prior BASF specification. Again, copies of new page 2 accompany this response.

New claim 1 is essentially a combination of original claims 1, 2, 6, 7, 8, 9, and 10.

The remaining claims have been renumbered and, where appropriate, reappended accordingly.

New claim 18 is an independent claim which very closely follows claim 1 but recites, in clause (d), the step of recovering lactic acid products therefrom in the lactic salt in a portion of the lactic acid-depleted aqueous solution.

The identity of the prior BASF specification acknowledged in new page 2 has been amended and, as correctly pointed out by the Examiner in the Written Opinion, is identified as EP-O 159 585.

It is submitted that new independent claims 1 and 18 both distinguish the present invention from the disclosure in U.S. Patent 5,132,456. That prior U.S. patent does not teach the ability to recover lactic acid from the salt in the acid-depleted solution. Furthermore, the ability to use the loaded extractant out of step (d) for the extraction in step (a) and still reach extraction of at least 70% of the free acid is neither taught nor suggested either by cited U.S. Patent 5,132,456 alone or by the disclosure in that patent in combination with any of the other prior art.

Respectfully submitted,

Peter D. Galloway

PDG/cgt

1. A process for the recovery of lactic acid and products thereof from an aqueous solution containing free lactic acid and at least one lactate salt at a total concentration of at least 5%, said process comprising the steps of:
 - (a) extracting at least 70% of the free acid from said aqueous solution by contacting said acid-depleted, lactate salt-containing aqueous solution;
 - (b) separating said lactic acid-containing extract from said depleted aqueous solution;
 - (c) stripping said extracted lactic acid from said extract by methods known per se, to form a solution of lactic acid and stripped basic extractant;
 - (d) recovering lactic acid and products thereof from said lactate salt in said lactic acid-depleted aqueous solution by a method comprising extraction with a basic extractant, substantially as obtained in step (c), to form lactic acid containing extractant; and
 - (e) using said lactic acid-containing extractant from step (d), substantially as is, as said basic extractant in step (a).
2. A process according to claim 1, wherein the ratio between said free lactic acid and said lactate salt is between 1:9 and 5:1.
3. A process according to claim 1, wherein the ratio between said free lactic acid and said lactate salt is between 1:9 and 3:1.
4. A process according to claim 1, wherein said basic extractant comprises a portion of lactic acid and said solution is contacted with said extractant to form an extract comprising lactic acid in an amount greater than said portion and a lactic acid-depleted, lactate salt-containing aqueous solution.
5. A process according to claim 1, wherein said adjustment comprises adding a polar solvent.
6. A process according to claim 1, wherein said adjustment comprises removing a polar solvent.
7. A process according to claim 1, wherein the ratio of free lactic acid to lactate salt is up to 2:1.
8. A process according to claim 1, wherein the basic extractant used in step (a) comprises at least 3% of the lactic acid extracted in a previous step.
9. A process according to claim 1, wherein said aqueous solution is concentrated by water evaporation prior to step (a).

10. A process according to claim 1, wherein said aqueous solution containing free lactic acid and lactate salt is a result of fermentation.
11. A process according to claim 1, wherein said lactate salt is selected from the group consisting of calcium lactate, sodium lactate and ammonium lactate.
12. A process according to claim 1, wherein said basic extractant in step (a) has a basicity corresponding to pKa lower than 7.
13. A process according to claim 1, wherein:
 - said basic extractant in step (a) is recycled from a previous step;
 - said lactic acid-loaded extract obtained in step (a) is stripped to form a solution of purified lactic acid and said stripped extractant;
 - said stripped extractant obtained in step (c) is used for the recovery of lactic acid from said lactate salt in step (d); and
 - the lactic acid-comprising extract formed in step (d) is used for extraction of free lactic acid in step (a).
14. A process according to claim 1, wherein said recovery of lactic acid from said lactate salt in step (a) is effected under CO₂ pressure.
15. A process according to claim 1, wherein said recovery of lactic acid and products thereof from said lactate salt in said lactic acid-depleted aqueous solution is achieved by using an acid stronger than lactic acid.
16. A process according to claim 14, wherein said stronger acid is sulfuric acid, and a sulfate salt is formed as a by-product.
17. A process according to claim 1, wherein said recovery of lactic acid and products thereof from said lactate salt in said lactic acid-depleted aqueous solution is achieved through the use of electric energy.
18. A process for the recovery of lactic acid and products thereof from an aqueous solution containing free lactic acid and at least one lactate salt at a total concentration of at least 5%, said process comprising the steps of:
 - (a) extracting at least 70% of the free acid from said aqueous solution by contacting said acid-depleted, lactate salt-containing aqueous solution;
 - (b) separating said lactic acid-containing extract from said depleted aqueous solution;
 - (c) stripping said extracted lactic acid from said extract by methods known per se, to form a solution of lactic acid and stripped basic extractant;

(d) recovering lactic acid and products thereof from said lactate salt in a portion of said lactic acid-depleted aqueous solution by a method comprising extraction with a basic extractant, substantially as obtained in step (c), to form lactic acid containing extractant; and

(e) using said lactic acid-containing extractant from step (d), substantially as is, as said basic extractant in step (a).

CHAPTER II

**TRANSMITTAL LETTER
TO THE UNITED STATES ELECTED OFFICE (EO/US)
(ENTRY INTO U.S. NATIONAL PHASE UNDER CHAPTER II)**

PCT/US97/15844 2 OCTOBER 1997 9 OCTOBER 1996
INTERNATIONAL APPLICATION NO. INTERNATIONAL FILING DATE PRIORITY DATE CLAIMED

A PROCESS FOR THE RECOVERY OF LACTIC ACID BY CONTACTING AQUEOUS SOLUTIONS
CONTAINING THE SAME WITH A BASIC ORGANIC EXTRACTANT

TITLE OF INVENTION

EYAL, Aharon Meir; GRUBER, Patrick, R.; FISHER, Rod, R.; KOLSTAD, Jeffrey, J.
APPLICANT(S)

Box PCT
Assistant Commissioner for Patents
Washington D.C. 20231
ATTENTION: EO/US

NOTE: *The completion of those filing requirements that can be made at a time later than 30 months from the priority date results from the Commissioner exercising his judgment under the authority granted under 35 USC 371(d). The filing receipt will show the actual date of receipt of the last item completing the entry into the national phase. See 37 C.F.R. §1.491 which states: "An international application enters the national state when the applicant has filed the documents and fees required by 35 USC 371(c) within the periods set forth in § 1.494 and § 1.495."*

WARNING: *Where the items are those which can be submitted to complete the entry of the international application into the national phase are subsequent to 30 months from the priority date the application is still considered to be in the international state and if mailing procedures are utilized to obtain a date the express mail procedure of 37 C.F.R. §1.10 must be used (since international application papers are not covered by an ordinary certificate of mailing - See 37 C.F.R. §1.8.*

NOTE: *Documents and fees must be clearly identified as a submission to enter the national state under 35 USC 371 otherwise the submission will be considered as being made under 35 USC 111. 37 C.F.R. § 1.494(f).*

1. Applicant herewith submits to the United States Elected Office (EO/US) the following items under 35 U.S.C. 371:

CERTIFICATION UNDER 37 C.F.R. 1.10*
(Express Mail label number is **mandatory**.)
(Express Mail certification is optional.)

I hereby certify that this correspondence and the documents referred to as attached therein are being deposited with the United States Postal Service on this date April 8, 1999, in an envelope as "Express Mail Post Office to Addressee," Mailing Label Number EE784103730US, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

GERALDINE MARTI

(type or print name of person mailing paper)


Signature of person mailing paper

WARNING: *Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.*

***WARNING:** *Each paper or fee filed by "Express Mail" must have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C.F.R. 1.10(b).
"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will not be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.*

- a. ☒ This express request to immediately begin national examination procedures (35 U.S.C. 371(f)).
- b. ☒ The U.S. National Fee (35 U.S.C. 371(c)(1)) and other fees (37 C.F.R. § 1.492) as indicated below:

2. Fees

CLAIMS FEE	(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) CALCULATIONS
<input type="checkbox"/> *	TOTAL CLAIMS	18 - 20 =	0	x \$ 18.00 =	\$
	INDEPENDENT CLAIMS	2 - 3 =	0	x \$ 78.00 =	
	MULTIPLE DEPENDENT CLAIM(S) (if applicable) + \$260.00				
BASIC FEE**	<input type="checkbox"/> U.S. PTO WAS INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where an International preliminary examination fee as set forth in § 1.482 has been paid on the international application to the U.S. PTO: <input type="checkbox"/> and the international preliminary examination report states that the criteria of novelty, inventive step (non-obviousness) and industrial activity, as defined in PCT Article 33(2) to (4) have been satisfied for all the claims presented in the application entering the national stage (37 CFR 1.492(a)(4)) \$96.00 <input type="checkbox"/> and the above requirements are not met (37 CFR 1.492(a)(1)) \$670.00				
	<input type="checkbox"/> U.S. PTO WAS NOT-INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where no international preliminary examination fee as set forth in § 1.482 has been paid to the U.S. PTO, and payment of an international search fee as set forth in § 1.445(a)(2) to the U.S. PTO: <input type="checkbox"/> has been paid (37 CFR 1.492(a)(2)) \$760.00 <input type="checkbox"/> has not been paid (37 CFR 1.492(a)(3)) \$970.00 <input checked="" type="checkbox"/> where a search report on the international application has been prepared by the European Patent Office or the Japanese Patent Office (37 CFR 1.492(a)(5)) \$840.00				\$840.00
	Total of above Calculations				= \$840.00
SMALL ENTITY	Reduction by ½ for filing by small entity, if applicable. Affidavit must be filed. (note 37 CFR 1.9, 1.27, 1.28)				-
	Subtotal				\$840.00
	Total National Fee				\$840.00
	Fee for recording the enclosed assignment document \$40.00 (37 CFR 1.21(h)). (See Item 13 below). See attached "ASSIGNMENT COVER SHEET".				
TOTAL	Total Fees enclosed				\$840.00

*See attached Preliminary Amendment Reducing the Number of Claims.

- i. ☒ A check in the amount of \$840.00 to cover the above fees is enclosed.
- ii. ☐ Please charge Account No. _____ in the amount of \$ _____.
- A duplicate copy of this sheet is enclosed.

****WARNING:** "To avoid abandonment of the application the applicant shall furnish to the United States Patent and Trademark Office not later than the expiration of 30 months from the priority date: * * * (2) the basic national fee (see § 1.492(a)). The 30-month time limit may not be extended." 37 C.F.R. § 1.495(b).

WARNING: If the translation of the international application and/or the oath or declaration have not been submitted by the applicant within thirty (30) months from the priority date, such requirements may be

met within a time period set by the Office. 37 C.F.R. § 1.495(b)(2). The payment of the surcharge set forth in § 1.492(e) is required as a condition for accepting the oath or declaration later than thirty (30) months after the priority date. The payment of the processing fee set forth in § 1.492(f) is required for acceptance of an English translation later than thirty (30) months after the priority date. Failure to comply with these requirements will result in abandonment of the application. The provisions of § 1.136 apply to the period which is set. Notice of Jan. 3, 1993, 1147 O.G. 29 to 40.

3. ☒ A copy of the International application as filed (35 U.S.C. 371(c)(2)):

NOTE: Section 1.495 (b) was amended to require that the basic national fee and a copy of the international application must be filed with the Office by 30 months from the priority date to avoid abandonment "The International Bureau normally provides the copy of the international application to the Office in accordance with PCT Article 20. At the same time, the International Bureau notifies applicant of the communication to the Office. In accordance with PCT Rule 47.1, that notice shall be accepted by all designated offices as conclusive evidence that the communication has duly taken place. Thus, if the applicant desires to enter the national stage, the applicant normally need only check to be sure the notice from the International Bureau has been received and then pay the basic national fee by 30 months from the priority date." Notice of Jan. 7, 1993, 1147 O.G. 29 to 40, at 35-36. See item 14c below.

- a. ☒ is transmitted herewith.
b. ☒ is not required, as the application was filed with the United States Receiving Office.
c. ☐ has been transmitted
i. ☐ by the International Bureau.
Date of mailing of the application (from form PCT/IB/308): _____
ii. ☐ by applicant on _____
Date

4. ☒ A translation of the International application into the English language (35 U.S.C. 371(c)(2)):

- a. ☐ is transmitted herewith.
b. ☒ is not required as the application was filed in English.
c. ☐ was previously transmitted by applicant on _____
Date
d. ☐ will follow.

5. ☒ Amendments to the claims of the International application under PCT Article 19 (35 U.S.C. 371(c)(3)):

NOTE: The Notice of January 7, 1993 points out that 37 C.F.R. § 1.495(a) was amended to clarify the existing and continuing practice that PCT Article 19 amendments must be submitted by 30 months from the priority date and this deadline may not be extended. The Notice further advises that: "The failure to do so will not result in loss of the subject matter of the PCT Article 19 amendments. Applicant may submit that subject matter in a preliminary amendment filed under section 1.121. In many cases, filing an amendment under section 1.121 is preferable since grammatical or idiomatic errors may be corrected." 1147 O.G. 29-40, at 36.

- a. ☐ are transmitted herewith.
b. ☐ have been transmitted
i. ☐ by the International Bureau.
Date of mailing of the amendment (from form PCT/IB/308): _____
ii. ☐ by applicant on _____
Date
c. ☒ have not been transmitted as
i. ☒ applicant chose not to make amendments under PCT Article 19.
Date of mailing of Search Report (from form PCT/ISA/210): April 4, 1998
ii. ☐ the time limit for the submission of amendments has not yet expired.
The amendments or a statement that amendments have not been made will be transmitted before the expiration of the time limit under PCT Rule 46.1.

6. ☒ A translation of the amendments to the claims under PCT Article 19 (38 U.S.C. 371(c)(3)):
- a. ☐ is transmitted herewith.
 - b. ☐ is not required as the amendments were made in the English language.
 - c. ☒ has not been transmitted for reasons indicated at point 5(c) above.
7. ☒ A copy of the international examination report (PCT/IPEA/409)
- ☒ is transmitted herewith.
 - ☒ is not required as the application was filed with the United States Receiving Office.
8. ☒ Annex(es) to the international preliminary examination report
- a. ☒ is/are transmitted herewith.
 - b. ☒ is/are not required as the application was filed with the United States Receiving Office.
9. ☒ A translation of the annexes to the international preliminary examination report
- a. ☐ is transmitted herewith.
 - b. ☒ is not required as the annexes are in the English language.
10. ☒ An oath or declaration of the inventor (35 U.S.C. 371(c)(4)) complying with 35 U.S.C. 115
- a. ☐ was previously submitted by applicant on _____.
Date
 - b. ☒ is submitted herewith, and such oath or declaration
 - i. ☐ is attached to the application.
 - ii. ☐ identifies the application and any amendments under PCT Article 19 that were transmitted as stated in points 3(b) or 3(c) and 5(b); and states that they were reviewed by the inventor as required by 37 C.F.R. 1.70.
 - iii. ☒ will follow.

Other document(s) or information included:

11. ☒ An International Search Report (PCT/ISA/210) or Declaration under PCT Article 17(2)(a):
- a. ☒ is transmitted herewith.
 - b. ☐ has been transmitted by the International Bureau.
Date of mailing (from form PCT/IB/308): _____.
 - c. ☐ is not required, as the application was searched by the United States International Searching Authority.
 - d. ☐ will be transmitted promptly upon request.
 - e. ☐ has been submitted by applicant on _____.
Date
12. ☒ An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98:
- a. ☒ is transmitted herewith.
Also transmitted herewith is/are:
 - ☒ Form PTO-1449 (PTO/SB/08A and 08B).
 - ☒ Copies of citations listed.
 - b. ☐ will be transmitted within THREE MONTHS of the date of submission of requirements under 35 U.S.C. 371(c).
 - c. ☐ was previously submitted by applicant on _____.
Date

13. ☐ An assignment document is transmitted herewith for recording.

A separate ☐ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.

14. ☒ Additional documents:
- a. ☒ Copy of request (PCT/RO/101)
 - b. ☒ International Publication No. WO 98/15517
 - i. ☒ Specification, claims and drawing
 - ii. ☐ Front page only
 - c. ☐ Preliminary amendment (37 C.F.R. § 1.121)
 - d. ☒ Other

(IPEA/402) Notification of Receipt of Demand

(IPEA/408) Written Opinion

Reply to Written Opinion of November 3, 1998

15. ☒ The above checked items are being transmitted
- a. ☒ before 30 months from any claimed priority date.
 - b. ☐ after 30 months.
16. ☐ Certain requirements under 35 U.S.C. 371 were previously submitted by the applicant on _____, namely:

AUTHORIZATION TO CHARGE ADDITIONAL FEES

WARNING: *Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges if extra claims are authorized.*

NOTE: *"A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 C.F.R. § 1.136(a)(3).*

NOTE: *"Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 C.F.R. § 1.26(a).*

- ☒ The Commissioner is hereby authorized to charge the following additional fees that may be required by this paper and during the entire pendency of this application to Account No. 12-0425.

☒ 37 C.F.R. 1.492(a)(1), (2), (3), and (4) (filing fees)

WARNING:

Because failure to pay the national fee within 30 months without extension (37 C.F.R. § 1.495(b)(2)) results in abandonment of the application, it would be best to always check the above box.

☐ 37 C.F.R. 1.492(b), (c) and (d) (presentation of extra claims)

NOTE: *Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 C.F.R. § 1.492(d)), it might be best not to authorize the PTO to charge additional claim fees, except possible when dealing with amendments after final action.*

☒ 37 C.F.R. 1.17 (application processing fees)

☐ 37 C.F.R. 1.17(a)(1)-(5)(extension fees pursuant to § 1.136(a).

☒ 37 C.F.R. 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. 1.311(b))

NOTE: *Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 C.F.R. § 1.311(b).*

NOTE: *37 C.F.R. 1.28(b) requires "Notification of any change in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying . . . issue fee." From the wording of 37 C.F.R. § 1.28(b): (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.*

☒ 37 C.F.R. § 1.492(e) and (f) (surcharge fees for filing the declaration and/or filing an English translation of an International Application later than 30 months after the priority date).



SIGNATURE OF PRACTITIONER

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Customer No.:

William R. Evans

(type or print name of practitioner)

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